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# Commercial strategies and horizontal diffusion of innovations in a sheep farming co-operative enterprise: The case of "Carne-Aragón"

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**SUMMARY** - We have briefly reviewed the innovation process and the role of enterprises in the agricultural sector. After this, we have described the characteristics of the production system in the sheep farms belonging to the co-operative Carne-Aragón (Spain), as well as its innovation procedures and internal diffusion processes.

**Key words:** Innovation diffusion, sheep farming, co-operative, management.

**RESUME** - "Stratégies commerciales et diffusion horizontales des innovations dans une entreprise coopérative d'élevage ovin : Le cas de "Carne-Aragón". On fait des considérations sur l'innovation et le rôle que joue l'entreprise dans le secteur agricole. On décrit les caractéristiques des systèmes de production pratiqués par les exploitations associées dans une Coopérative "Carne-Aragón" (Espagne) et les types d'innovations et le processus de diffusion interne que suit la coopérative.

**Mots-clés :** Diffusion d'innovations, système d'élevage ovin, coopérative, gestion.

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## Introduction

Innovation can refer to the introduction of new goods or productive methods, to the opening of new markets, new sources of supplies or the creation of new organizations. Considering new combinations of factors and productive capacities which appear discontinuously and suddenly in time (Schumpeter, 1967) makes the enterprise more competitive and is the cause of structural adjustment in the economic system.

For Schumpeter's theory entrepreneurs play a relevant role as bringers-about of innovation. Qualifications to this theory define technological change and diffusion as a single and continuous process and as an economic phenomenon whose goal is to obtain profits (Farinos, 1986). Technological change in agriculture is conditioned by its dependence on other sectors. The prices of the inputs needed in the productive processes are increasingly high and hard to compensate for by the value of the output, which has given rise to the present crisis in incomes. Some vital inputs are technological improvements themselves and can condition the profitability of the productive process. From this situation two different theories about the origin of technological change in agriculture arise. One considers that it is organized and promoted from external innovative centres and/or diffusers (García Ferrando, 1977). The other sees the process as endogenous to the sector itself (Jarret, 1985), since of all the available technical possibilities available only those which allow the obtaining of greater profitability become innovations.

Agricultural innovations grow out of apprenticeship, formal research and international transfer; sources which correspond to different levels of development and which generate differences between regions and countries. The evolution of the prices of factors of production provides a setting for the type of technology introduced. Public bodies can also directly or indirectly influence the choice. At the same time the nature and type of the innovation is connected with the structure of the farm, since "sufficient size" and technological innovation are related concepts (Bacaría, 1983).

In competitive economies the speed of adoption of the innovation depends on the yields obtained by its application, the commercial efforts of companies, the actions of public bodies and attitudes of

those involved (Rivera, 1985). The characteristics of the farm and the farmer and specific conditions linked to the market are factors of the agricultural sector itself which also influence the process of adoption.

In the sheep production sector innovation in products, techniques and processes has been of relatively little importance, which explains the low increase in labour productivity which is a characteristic of the sector. The characteristics of many of the innovations (their relative advantages, compatibility, complexity, divisibility, communicability) (Farinos, 1986) have made adoption more difficult. The processes of both the diffusion by which they are assimilated by the sector and of adoption by which the farmer moves from a first knowledge of the innovation to its final adoption have highlighted difficulties which are greater in the sheep farming sector than in other livestock sectors. To a large extent the characteristics of sheep producers and their systems have hindered the stages of the process pointed out by Rogers (1962).

## **Associative organization of sheep producers in the Ebro valley and general productive system**

The Co-operative Society "Carne-Aragón" brings together more than 730 sheep farms and 200,000 sheep, located in the middle valley of the Ebro (Spain), generally in the Autonomous Community of Aragón. Its objective is the commercialization of sheep, mainly in the areas of the Ebro valley and the Spanish Levant, but also in other areas of the Iberian peninsula, France and Italy. Recently it has formed, together with another enterprise, a second grade co-operative specializing in the distribution of all kinds of meats, which substantially widens its potential market.

The sheep farms grouped together in "Carne-Aragón" can be characterized, generically, as family mixed crop livestock farms, focusing on meat production. On dry lands they grow cereals and also permanent crops (vine, almond, olive); and on irrigated land preferably herbaceous cereal crops (wheat, maize), commercial forage crops (lucerne), oleaginous crops (sunflower) and occasionally fruit.

From the average figures of the group of farms included in the plan of Technical-Economic Management (118), we can describe the general features of the system. They are farms with a flock of 518 heads (459 sheep), the majority of the race "Rasa aragonesa", with a tendency towards racial homogenization in the flocks although they do practise purpose crosses. They have 1,131 AWU (87% family members) and a UAA of 78 ha (25% irrigated). Forage area makes up 34% of the farm. For their own production of feed they have cereals (barley and maize), lucerne hay (main forage) and barley straw. The average land grazed (communal and rented) is 598 ha. Rents and average feed purchases make up 41% of the intermediate consumption. 50% of the purchased feed inputs is for concentrates for lambs. Bulky feeds and concentrated feed stuffs for the reproductive flock make up 26.2% and 22% respectively. The income from the sale of lambs is 91.8% of the productive income (without subsidies). The quality label "Ternasco de Aragón" makes up 11% of the total sales. Classifying the farms as extensive, semi-intensive or intensive, according to three levels of purchased feeds inputs per sheep, we see that the first group is 26% of the total and the intensive group 22%. The whole group presents an average fertility level of 1.09; prolificacy 1.31 (28% double births); this leads to 1.12 lambs sold per sheep, with an average carcass weight of 9.81 kg.

## **The process of innovation diffusion in "Carne-Aragón"**

### **Objective of the adoption of innovations**

The generic objectives of an economic nature which go with all innovation processes are expressed in Carne-Aragón in the improvement of commercialization, so:

(i) *The seeking of a supply-demand balance throughout the year* as well as affecting commercial management techniques undertaken by the management of the enterprise also affects the members in that it modifies various aspects of their production systems.

(ii) *Improvement in the quality of the products* of the members, which also influences the production system.

## Origins of the innovations

The innovations originate at the following sources:

(i) *General external research*, divulged to the associates via the Technical Services of the society and other informative agents.

(ii) *Applied research and the society's own experiments*, developed with co-operation agreements between the entreprise and its own technical service and vas bodies. Amongst these:

- *Analysis and periodical conclusions* obtained by the Technical-Economic Management section (fine-tuned by the university).
- *Genetic improvement* from the UPRA section of the co-operative. This includes 45 farms (34,000 sheep) and works with various official bodies: Servicio Investigación Agraria-DGA (assessment and improvement of techniques like artificial insemination (AI), embryo transfer); SFEA-DGA (production control); CENSYRA (progeny testing, preparation of straws); INIA-Madrid (genetic evaluation).
- Regarding *the classification of "in vivo" carcasses* (management of classification and programmes for updated stock fattening units) with the "Instituto Tecnológico de Aragón".
- *Improvement in the food conversion rate*, control of residues in marketed feed stuff, quality and typification of lambs (University of Zaragoza).

## Means and agents of diffusion

The co-operative has several means of its own for the diffusion of innovations:

(i) *Technical and commercial information media*. Basically the bulletin "Carne-Aragón Informe", which is published periodically and gives information on techniques to improve production and commercialization. The results of the Technical-Economic Management are also used to advise members and as a source of information about the general situation of the sector.

(ii) *Talks, meetings and educational courses*. Both for specialists themselves (quality improvement technology, homogenization of sales techniques) and also for member farmers (quality improvement, margins and commercialization, techniques for the production of quality lambs). The courses are carried out in collaboration with the federation of co-operatives FACA, 80% subsidized by the Ministry of Agriculture and financed by the European Social Fund.

(iii) *The Services and Supplies section and the team of specialists which makes it up (11)*. This are the main means and main agents of diffusion. This team designs and participates in the development of hygiene programmes, in genetic improvement (data of reproductive livestock, synchronization of oestrus, A.I., identification of offspring, real time ultra sound scanner, assessment/demonstration), in the control of reproduction and production (40 farms) (monthly reports), periodical visits to members (700) and in technical-economic management; they participate in courses, in the co-ordination of shearing services, assessment on feeding and reproduction, etc.

## Types of innovations

Carne-Aragón divulges three sorts of innovations: those of a zootechnical nature; those which solve business problems (for example technical-economic management), and those related to market problems (co-operative business organization itself). Furthermore it applies information technology in two of the three fields which Castells (1986) indicates as being for agricultural application; technical-economic management and the automation of productive processes.

From another perspective we can consider the existence, although closely related, of:

(i) *Process innovations*. These affect the system of lamb production, feeding, reproduction (purpose crosses, donation and offer of progesterone-impregnated sponges, automation of pregnancy testing systems on the farm); technical-economic management and the innovations in the

classification/commercialization process (automation of the system for classification of lambs when they enter the fattening unit over real market value).

(ii) *Product innovations*. Relative increase in sales and members producing the quality label "Ternasco de Aragón" in the total of lambs sold as a "specific quality product". Technical innovations (race, hygiene, crosses which lead to a decrease in the average weight collection and decrease in the collection of badly considered categories, all these as an improvement in the average quality of the final product).

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